

## Math Problems 4 Fall 2019

Please answer all of these questions. They can be answered on separate paper.

All of these questions are based on the following geometric objects:

$$A = (3, 2, -5)$$

$$B = (2, 3, -5)$$

$$C = (1, 1, 1)$$

$$v = (-4, -3, 0)$$

**Q1.** (10 points) Find the surface normal for a plane going through the points ABC.

**Q2.** (10 points) What is the cosine of the angle between the surface normal and a directional light coming from direction  $v$ ? Make sure the surface normal is facing toward the light and explain how you know.

**Q3.** (5 points) Will the diffuse component of the lighting computation be relatively large or small?